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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/803,404	03/09/2001	Takahiro Fukuhara	450100-03057	8710

20999 7590 05/24/2004
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EXAMINER

CHEN, WENPENG

ART UNIT PAPER NUMBER

2624

DATE MAILED: 05/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/803,404

Applicant(s)

FUKUHARA ET AL.

Examiner

Wenpeng Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 14-23,26 and 27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13,24 and 25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

Election/Restrictions

1. This application contains claims directed to the following patentably distinct species:

- Species 1 corresponding to Figs. 1-8 to code images with wavelet transform and with adjusted weighting coefficients in quantizing wavelet coefficients, for example shown in embodiment 1;

- Species 2 corresponding to Figs. 1 and 18-20 to code images with wavelet transform and with bit shifting of wavelet coefficients, for example as shown in embodiment 8.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claim is generic to Species 1 and Species 2.

2. During a telephone conversation with Mr. Williams S. Frommer on 5/7/2004 a provisional election was made with traverse to prosecute the invention of Species 1, Claims 1-13, 24, and 25. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-23, 26, and 27 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the

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application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 5-6, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (US patent 5,926,791) in view of Chui et al. (US patent 6,229,926.)

Ogata teaches a picture encoding apparatus comprising:

-- memory means for writing and storing an input picture; (In Fig. 6, the input data are read and processed with LPF and HPF. The filtering processes inherently require memory for the recited purpose.)

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-- wavelet transform means for applying wavelet transform in the horizontal and vertical directions; (Fig. 6)

-- quantization means for quantizing wavelet transform coefficients obtained from said wavelet transform means; (56a-56g of Fig. 6)

-- entropy encoding means for entropy encoding quantized coefficients from said quantization means; (encoder 57 of Fig. 6; column 6, lines 54-61; column 10, lines 50-61; column 12, lines 25-38)

-- quantization means quantizing the wavelet transform coefficients, *using at least one of weighting coefficients of a table provided at the outset for each sub-band generated on wavelet transform* and weighting coefficients found from one block area picture forming a picture to another; (column 6, lines 41-53; column 10, lines 50-61; column 12, lines 25-38; Each quantization step of 56a-56g in Fig. 6 quantizes every coefficients in a subband. The collection of the quantization steps is a table. The claim as recited requires only one kind of weighting coefficients.)

-- wherein weighting coefficients of said table of said quantization means provided from the outset for each sub-band are such that, the larger the number of sub-band splitting stages, the larger become the weighting coefficients and the higher becomes the priority placed on the weighting coefficients, and conversely, the smaller the number of the splitting stages, the smaller become the weighting coefficients and the lower becomes the priority placed on the weighting coefficients, and such that, in sub-bands of the same splitting stage, the weighting coefficients become smaller for the high range than for the low range to decrease the priority of the weighting coefficients; (column 6, lines 41-53; column 10, lines 50-61; column 12, lines 25-38)

-- wherein said input picture is a continuous picture of a plurality of frames and wherein the input continuous picture is sequentially encoded from one frame to another. (column 1, lines 12-18; Video signals are processed.)

However, Ogata does not teach the features related to the line-by-line wavelet process of Claim 1.

Chui teaches a picture encoding apparatus with wavelet compression tile-by-tile comprising:

-- memory means for writing and storing an input picture from one line to another; (Figs. 7-8 and 9; Table 2; passages discussing Figs 7-8 and 9 for example column 9, line 53 to column 10, line 25)

-- wavelet transform means for applying wavelet transform in the horizontal and vertical directions each time a picture stored in said memory means reaches the number of lines required for wavelet transform; (Figs. 7-8 and 9; Table 2; passages discussing Figs 7-8 and 9 for example column 9, line 53 to column 10, line 25)

-- quantization means for quantizing wavelet transform coefficients obtained from said wavelet transform means; (Fig. 2)

-- wherein quantization coefficients obtained from said quantization means are collected in terms of a block as a unit, and wherein, at a time point a given block is filled with quantization coefficients, entropy encoding is performed by said entropy encoding means; (Fig. 2; The wavelet coefficients of a tile is collected as a unit and then encoded.)

-- wherein said input picture is split into a plurality of rectangular tiles and written in said memory means. (Fig. 2; The image is divided into tiles.)

It is desirable to process images in a system with moderate amount of working memory such as a digital camera. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Chui's teaching to decompose Ogata's images into wavelet subbands in an image-tile version and then quantize the resulted wavelet coefficients with Ogata's approach because the combination provides high-efficient wavelet compression in a system with moderate amount of working memory.

The above-cited passages also teach the corresponding method of Claim 24.

7. Claims 7-10, 12-13, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (US patent 5,926,791) in view of Chui et al. (US patent 6,229,926) and Ribas-Corberat et al. (US patent 6,111,991.)

As discussed above with regard to Claim 1 and its dependent claims, the combination of Ogata and Chui teaches the memory means, wavelet transform means, and the entropy encoding means recited in Claims 7 and 10, 12, and 13.

However, the combination of Ogata and Chui does not teach the features related to "block picture analysis means."

Ribas-Corbera teaches a dynamic quantization system comprising:

-- block picture analysis means for analyzing the motion information in a block picture and the degree of fineness of the texture for each block area in said input picture; (column 3, lines 46-58; column 5, lines 1-16; The energy of a block is the degree of fineness of the texture for each block area.)

-- means for computing weighting coefficients for quantization of said block picture area using the analysis information from said block picture analysis means; (eq. (7) in column 6)

-- wherein said quantization means includes means for determining ultimate weighting coefficients for quantization. (column 5, line 34 to column 6, line 39; The optimal quantization values are generated.)

It is further desirable to reduce distortion to an image by assigning different quantization steps to different area of the image. The block of Ribas-Corbera can be of any size such as that Chui's tile. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Ribas-Corbera's teaching to analyze the energy and motion of each Chui's tile and use the energy and motion to adjust Ogata's all of quantization steps of all subbands associated with the tile, because the overall combination reduces distortion to an image after wavelet compression and decompression. Because Ribas-Corbera selects optimal quantization for each tile, the combination thus teaches:

-- wherein said quantization means includes means for determining ultimate weighting coefficients for quantization using both sub-band based table weighting coefficients and weighting coefficients derived from said analysis information.

The above-cited passages also teach the corresponding method of Claim 25.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (US patent 5,926,791) in view of Chui et al. (US patent 6,229,926) as discussed above, and further in view of Keith et al. (US patent 5,881,176.)

The combination of Ogata and Chui teaches the parental Claim 3. However, it does not teach the feature related to bit planes recited in Claim 4.

Keith teaches coding with (1) wavelet transform in a tile format and (2) entropy encoder with bit plane, comprising:

-- wherein said entropy encoding means resolve quantization coefficients in said block into bit planes composed of binary data and executes arithmetic encoding depending on the occurrence probability distribution of symbols in each bit plane, and wherein the estimation of said probability distribution is performed only on data in a predetermined block. (Figs. 12, 14)

It is desirable to facilitate selecting parts of compressed data based onto structure, such as the frequency band and importance level for various users. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Keith's bit plane encoding approach to encode the quantized wavelet coefficients generated in the system taught by the combination of Ogata and Chui, because the overall combination provides flexibility of the compressed data for various users.

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (US patent 5,926,791) in view of Chui et al. (US patent 6,229,926) and Ribas-Corberat et al. (US patent 6,111,991) as discussed above, and further in view of Keith et al. (US patent 5,881,176.)

The combination of Ogata, Chui, and Ribas-Corberat teaches the parental Claim 10. However, it does not teach the feature related to bit planes recited in Claim 11.

Keith teaches coding with (1) wavelet transform in a tile format and (2) entropy encoder with bit plane, comprising:

-- wherein said entropy encoding means resolve quantization coefficients in said block into bit planes composed of binary data and executes arithmetic encoding depending on the

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occurrence probability distribution of symbols in each bit plane, and wherein the estimation of said probability distribution is performed only on data in a predetermined block. (Figs. 12, 14)

It is desirable to facilitate selecting parts of compressed data based onto structure, such as the frequency band and importance level for various users. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Keith's bit plane encoding approach to encode the quantized wavelet coefficients generated in the system taught by the combination of Ogata, Chui, and Ribas-Corberat, because the overall combination provides flexibility of the compressed data for various users.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 703 306-2796. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703 308-7452. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications. TC 2600's customer service number is 703-306-0377.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

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Wenpeng Chen
Primary Examiner
Art Unit 2624

May 19, 2004

A handwritten signature in black ink, appearing to read 'Wenpeng Chen', is written over the printed name and title.